

## CURRENT AND FUTURE ISSUES ON SUSTAINABLE DEVELOPMENT OF ANINA LOCALITY

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**Abstract:** Europa 2020 program is based on three objectives: "smart growth", "sustainable growth" and "inclusive growth". In the European and national context, sustainable development of the locality Anina involves establishing projects / measures for solving the main problems of it, in order to achieve sustainable economic development, socially inclusive, leading to increasing GDP / capita and reducing intra-regional disparities. Starting from the diagnosis condition of socio-economic on fields: infrastructure, urban development, economy, agriculture and forestry, tourism, environment, and considering the tradition and specificity of current sustainable development, is possible by harnessing natural and man meant by implementing projects grouped into eight strategic axes, while identifying appropriate funding programs. Thus, Axis 1 Development of infrastructure and public utilities work out the measures necessary in infrastructure of roads, water supply, sewerage and wastewater treatment, waste management, on the 2015-2020 horizon.

**Key words:** sustainable growth, socio-economic analysis, sustainable development, public utilities infrastructure

### INTRODUCTION

Communities in Romania are crossing a period of profound transformations, and after joining the European Union are facing real challenges in sustainable development. In the current context of the new programming period 2015-2020, according to three basic objectives of the Europe 2020 strategic program: "smart growth", "sustainable growth" and "inclusive growth", and the objectives of the National Strategy Horizons 2030, developing local strategies for sustainable development based on exploitation of natural and human resources, from and to the local tradition, is imperative. These are tools which facilitate the implementation of projects / measures tailored to local development, taking into account the needs of future generations and folded on the lines of action of the main operational programs 2014-2020 term sustainable development includes all actions aimed at improving quality of life to preserve natural and cultural landscape and ensure sustainable development of residential areas, according to conditions and specific places.[4] Sustainable development requires sustainable development in economic, environmental and social aspects.

Extensive process of economic restructuring, which included the mining sector to the economy of the Anina locality was firmly anchored, had the immediate effects: rising unemployment, lower living standards of the population, the decline of the local budget, the migration of population, including active - mostly young, to other areas in the region, the country or abroad. In this context, sustainable development of the Anina locality involves establishing projects / measures for solving the main problems of the village in order to achieve sustainable economic development, socially inclusive, leading to increasing GDP / capita and reducing intra-regional disparities.

## MATERIALS AND METODS

Starting from the diagnosis condition of socio-economic development of the town, in various fields: infrastructure, urban development, economy, agriculture and forestry, tourism, environment, social assistance, education, culture, its sustainable development is possible by harnessing natural and anthropic meant: large areas of protected areas, unique tourist attractions in the country and in Europe, the cultural traditions of the region.[3] There were identified thus strategic objectives and measures to stem depopulation trends and ensure sustainable economic growth, grouped into eight strategic axes, while identifying appropriate funding programs. These are:

- Strategic Axis 1: Infrastructure and public utilities;
- Strategic Axis 2: Improving the business environment and tourism development;
- Strategic Axis 3: Improving educational infrastructure;
- Strategic Axis 4: Improving social services infrastructure and health;
- Strategic Axis 5: Increasing the competitiveness and viability of farms;
- Strategic Axis 6: Environment - Sustainable Urban Development;
- Strategic Axis 7: Infrastructure cultural and sporting;
- Strategic Axis 8: Public administration effective and transparent European standards.[1]

Thus, Axis 1 - Development of infrastructure and public utilities work out the measures necessary for infrastructure of roads, water supply, sewerage and wastewater treatment, waste management on 2015-2020 horizon.

## RESEARCH RESULTS

### 1. CURRENT ISSUES ON INFRASTRUCTURE - ANINA LOCALITY

#### 1.1. ROAD TRANSPORT INFRASTRUCTURE

The current road network, largely responds the needs, but is needed restoration and rehabilitation of asphalt in some sectors. Also, works are needed to restore walkways and gutters.

Pedestrian traffic is achieved largely through sidewalks or walkways accompanying the streets of the residential area. Crossings of the main thoroughfares through places marked with no or reduced traffic lights, not involving major traffic lights works.

##### 1.1.1. NATIONAL ROAD INFRASTRUCTURE

The Anina locality is traversed by national road DN 58, which connects Resita and Anina, where it continues with national road DN 57B towards Oravița and national road DN 57B to Bozovoci, facilitating transit to Banat and Oltenia regions. National road DN 58 it is used for heavy transporting in area.

City road network has a length of 65 km, of which 28 km are modernized municipal streets:

- national road DN 58 - the main thoroughfare, linking Caransebeș and Anina, becomes street category III in intravilan, and side streets fall in the category IV;
- national road DN 57B - connects Oravița, Bozovici and Iablanița through Crivina.

##### 1.1.2. COUNTY CATEGORY ROAD INFRASTRUCTURE

County category roads crossing the Anina locality consists of:

- DJ 582 B - secondary road with a length of 7,5 km, linking Anina - Sigismund neighborhood and Oravița through Marila;
- DJ 582 C - Resita (DJ 582) - Anina (DN 58 km 30+900) with a length of 32 km, 20 km in the National Park Semenic Caraș Keys (km 30+900) - old road, not modernized and

inaccessible in winter. The road can play an important role in the tourism potential of the area;

➤ DJ 582 F - with a length of 3,9 km of which 3,5 km territory National Park Semenic Caraș Keys, emerges from DN 58 to Km 30+900 and connects the city with Marghitas tourist area, over the hill Colonovăț.

### 1.1.3. LOCAL AND FOREST ROADS INFRASTRUCTURE

Local road DP 9 is a road linking Anina and Carașova to Văliug, length 23 km, 2.5 km in National Park Semenic Caraș Keys and connects Anina with Klaus Villa, on the route Anina - Maial - Lake Buhui - Cârneală - Klaus Villa.

To ensure access to forest areas, and economic potential for exploitation of forest were built a number of forest roads, some of which are old roads and mining dating back to XIX century and early XX century. Currently, Anina Forest District has in the area of National Park Nera Beușnița Keys over 20 forest roads, the total length of approx. 65.5 km covering over 26 ha.

The National Park Semenic Caraș Keys has 21 forest roads with a total length of approx. 55 km, dirt roads in a poor state, requiring extensive maintenance and repairing works. The importance lies in the fact that forest roads can provide access to important areas for tourism development. Among them, there are:

- FE54 - road Cuptoare-Romanovăț - Cracul Rusului, 11,1 km;
- FE40 - Hotar UP IX – Borna 15,36 - Cereșnaia - Pârâul Carașului, 4,8 km;
- FE24 – Maial - La Cuptor, 3,5 km;
- FE 006 - Valea Călugăru - Valea Păuleasca, 8,9 km;
- FE 007 - Valea Călugăru - Valea Ursoanei, 5,9 km;
- FE 008 - Marila – Păuleasca, 5,8 km.

### 1.2. RAILWAY TRANSPORT INFRASTRUCTURE

The area is served by the normal railway network consisting in 33.8 km for passenger and cargo transport on route Anina-Oravița-Timișoara-Berzovia. Anina town has its own railway station for passengers and cargo. Anina is connected to Oravița by the oldest mountain railway in the country (difference of 338 m, 14 tunnels and 10 viaducts), also known as Banat Semmering, because of the similarity of the constructive Austrian railway from Semmering. (Figure 1).

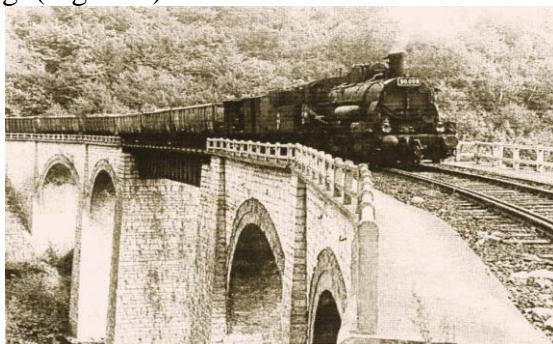


Figure 1 Anina-Oravița railway

### 1.3. HYDROTEHNICAL INFRASTRUCTURE

#### 1.3.1. DRINKING WATER SUPPLY SYSTEM

Anina has a centralized water supply system with multiple water sources, insufficient in case of drought and frost. The main source is Buhui Lake (Figure 2), complete with fountains: Colonovățul Mare, Colonovățul Mic, Tereziei Valley, Celnic source, Jitin source, Kraxental source și Grota Morii source. Raw water flows by gravity through an

open channel to the entrance to the cave Buhui (Figure 3), where the flow is supplemented by Certej source, where Buhui flows by gravity to the filter, which is treated by disinfection with sodium hypochlorite, in 2 x 90m<sup>3</sup> existing tanks.



Figure 2 Buhui lake [18]



Figure 3 Freshwater gravitational channel [18]

The total length of simple distribution of drinking water is 47 km and is generally very old, there are also areas where it was replaced. There is no filtering devices and no appropriate treatment, it is necessary expansion and modernization of the system. Network management is performed by AQUACARAS SA Reșița - Anina workstation.[18] Other relevant data:

- potable water production facilities – 1.450 cubic meters / day;
- total amount of drinking water supplied to consumers -167.000 cubic meters;
- total amount of drinking water supplied to consumers (household) -108.000 cubic meters.

Through the ISPA conducted at county level were rehabilitated sections of mains system and currently are ongoing works on contract "Construction and rehabilitation of water sources and wastewater water treatment in Resita, Bocșa, Anina and Oravița" financed by the cohesion fund under the project "Modernization of water and wastewater in Caras-Severin" nr. CS-SC-1 / 11.09.2012.[18]

### 1.3.2. SEWERAGE AND RAINWATER NETWORK

City has a sewage system with total length of sewerage pipes of 25 km, canals and channels nurse's uniform, which discharge waters directly into the creek Gîrliște and affect Gîrliștei Keys Reserve. By government ordinance no. 7/2006 with subsequent amendments was funded project "Sewage and waste Steierdorf, Anina city " investment work completed. Rainwater is collected by street gutters and channels unit, which discharge into streams in the area. Public institutions have septic tanks. Through the ISPA conducted at county level were rehabilitated sections of the sewerage network and currently are ongoing works contract "Construction and rehabilitation of treatment plants in Resita, Bocșa, Anina and Oravița" financed by the cohesion fund, within the project "Modernization of water and wastewater in Caras-Severin" nr. CS-SC-1 / 11.09.2012.[18]

### 1.3.3. WASTE MANAGEMENT

The waste infrastructure in the area has the following features:

- the current system of waste management consists of waste collection and transport to sorting and transfer station in Resita;
- the rate of access to sanitation services by 100%;
- selective waste collection is practiced on a small scale;
- the waste is collected mostly mixed system and transported to the warehouse;
- waste collection is generally household in the household; The operator has established special collection points recyclable waste (paper, cardboard, plastic, metal and glass) while creating a market for recyclables;

- equipment collection and transportation of waste are insufficient and outdated for the proper management of the whole amount of waste generated;
- in the county area are no facilities for sorting, except for small manual sorting stations for the recovery of metals, paper, cardboard and plastics;
- there is no waste composting facility and no organized system of biodegradable waste at the county level. Anina deposit (Figure 4) suspended in 2011 is among the urban deposits to be rehabilitated under the project "Integrated waste management in Caras-Severin".



Figure 4 Anina waste deposit [3]

The local operator is Anina hall and the location of disposal is 35 km from Resita. The area is unsustainable in ecological terms due to:

- field topography;
- lack of access infrastructure for collection areas;
- areas / suburbs;
- former mono-industrial area;
- lack of economic agents.[8]

Separate collection is done on a small scale, mainly in public institutions. Also collect of DEE is achieved in small scale. In Table 1 are presented the current status of the existing waste collection containers for collection area.

Table 1

The current status of collection in Lupac [3]

Area	Population	Paper and cardboard	Plastic and metal	Glass	Waste		
		1,1 mc	1,1 mc	1,1 mc	1,1 mc	120 l	240 l
Urban	121.298	33	32	0	185	4.650	910
Rural 1	51.419	2	7	1	12	1.257	940
Rural 2	14.416	0	0	0	60	550	0

In conclusion, strategic objectives and targets set out in the Accession Treaty and plans for waste management - National Plan for Management of Waste, Regional Waste Management Plan and County Waste Management Plan - can only be achieved through implementation of an integrated waste management system at county level.

## 2. PERSPECTIVE ASPECTS ON SUSTAINABLE DEVELOPMENT OF INFRASTRUCTURE IN ANINA LOCALITY

### 2.1. SUSTAINABLE DEVELOPMENT OF THE ROAD INFRASTRUCTURE

Sustainable Development Strategy 2015-2020 Caras-Severin County established in the county roads category, Priority Axis I - Improving connectivity and mobility to / from the county.[10] Development of transport infrastructure development priorities and measures / operations to achieve are:

- I.3.1. Rehabilitation / modernization of county roads that provide connectivity to the TEN-T:
  - rehabilitation / modernization of county roads (network length of rehabilitated / modernized compared to the total length of county roads will be 75% in 2020); Making rehabilitation of county roads with load capacity exceeded affecting the transport of goods and people;
  - construction of new roads and road belts;
  - impoundment works, consolidation, gabion walling;
  - the acquisition of mechanized equipment for maintenance; Other features.
- I.3.2. Construction / rehabilitation of bridges on county roads network provides connectivity to TEN-T:
  - construction / rehabilitation of bridges on county roads (number of bridges constructed / rehabilitated in relation to the number of bridges on county roads network will be 50% in 2020).
- I.3.3. Infrastructure development of municipal / town roads:
  - Rehabilitation / modernization of municipal / town roads, 300 km;
  - The execution of at least 70 km of municipal roads, urban expansion;
  - Creating parking; The establishment of bicycle tracks in cities;
- I.3.6. Developing the road network of localities:
  - Making urban street and pedestrian networks; The length of new municipal / town streets needed until the end of 2020 is more than 380 km; Rehabilitation / modernization of roads connecting town buses on national roads and crossing roads (streets category I), functional areas of residential (streets category II) as well as functional and residential areas to connecting streets or highways (streets category III);
- I.3.7. Increasing road transport safety:
  - Develop of unique traffic management systems;
  - Investing for the maintenance of road infrastructure;
  - Investing for ensuring the on road safety;
  - Purchase of intelligent transport systems -ITS;
  - Adopting flexible transport solutions for sustaining seasonal activities.

In the 2015-2020 period the following works are needed to the road network of the Anina city: rehabilitation of 50 kilometers, 4,5 km network expansion of streets, 5 culverts and 60 parking places.[10]

## 2.2. MASTER PLAN FOR WATER - WASTE WATER IN CARAS-SEVERIN. INVESTMENT PRIORITIES FOR ANINA LOCALITY

Master Plan for Water - Wastewater represents investment program for 30 years in the supply of water and sanitation at the county level, justify and prioritize investment projects needed to comply with the directives of the European Community (EC) plans and regional strategies and county in the field.[18] The area of the project is Caras-Severin, located in West Development Region with an area of 8519,76 km<sup>2</sup>, 26,59% of the region. Master Plan for Water - Wastewater for the project "Improving drinking water supply, sewerage and wastewater treatment in Caras-Severin" was developed at the Feasibility Study under Measure ISPA 2005 / RO / 16 / P / PE / 003. The main objectives of the project are:

- Ensuring compliance with national and European legislation during the transition period agreed between Romania and the EU for the environment sector:
  - Objective 1 - Implementation of EU Directive 91/271/EEC concerning urban waste and water collection and treatment;
  - Objective 2 - Ensuring compliance with EU Directive 98/83/EC on quality of water intended for human consumption;

- Ensuring optimal use of EU funds;
- Assist project managers responsible for local work to improve the capacity for future development projects.[18]

The purpose of the project is the rehabilitation and extension of water and sanitation for achieving the objectives 1 and 2. Major investment projects for the Anina town are shown in Table 2.

Table 2

Major investment projects for the town of Anina [18]

Anina City	Quantity
Rehabilitation of distribution network	2,704 km
Counting final consumers	1 508
Distribution network expansion	12 km
Rehabilitation of existing sewerage	20 km
Sewerage network expansion	20 km
<b>Total costs - Anina City ISPA</b>	<b>550.000 Euro</b>
<b>Total costs - Anina City other funding</b>	<b>7.355.000 Euro</b>

### 2.2.1. PRIORITY INVESTMENT IN WATER SUPPLY SYSTEM ANINA LOCALITY - MASTER PLAN WATER - WASTEWATER PHASE 1

The list of priority investments proposed to be made to agglomerate in the Master Plan water - wastewater Phase 1 are provided for the following works [18]:

- Project CS-CL-01 - construction and rehabilitation of water sources and water treatment stations in Resita, Bocșa, Anina and Oravița;
- Project CS-CL-12 Rehabilitation and extension of transmission pipes, distribution networks and sewerage networks in Anina.

By Water Master Plan - Phase 1, wastewater system proposed reconfiguration of existing water supply the Anina town, which in future will have a single source of freshwater - Lake Buhui and a new treatment station.

#### 2.2.1.1. WATER TREATMENT STATION ANINA

The main source of water - lake Buhui - has a minimum flow of 20 l/s and a maximum flow of 60 l/s. The main water data source of Buhui lake are shown in Table 3 and 4.

Table 3

Buhui lake characteristics [18]

Site	Area (ha)	Width (m)	Length (m)	Depth (m)	Volume (1000mc)
Buhui Km 4,3 Anina	9,8	79	1240	13,0	510

Table 4

List of the main uses of water provided by Lake Buhui [18]

POPULATION - 8964 / POPULATION EQUIVALENT (PE) - 10850			
Description	Operating conditions (days/year; hours/day)	Authorized Flows (mc/s)	
		Medium Flow	Minimum Flow
water supply Anina city	365 days/year; 24 hours/day	0,015	0,010

Water treatment plant is located in Anina and access is being made at the plant from national road DN 58 and partly on a forest road. New pumping station of raw water will be carried out inside the current treatment plant, in which currently is performed:

- raw water disinfection of water sources: Buhui, Tereziei Valley, Kraksenthal and Jitin;
- disinfection and sand filtration for water from the water source Grota Morii.

The water from water sources Colonovățul Mare and Colonovățul Mic is not treated. By contract works in CS-CL-01 construction and rehabilitation of water sources and water treatment stations in Resita, Bocșa, Anina and Oravița there will be a new treatment plant and SCADA system will be introduced. The station will provide a

maximum daily rate of 1976 m<sup>3</sup>/day and will provide raw water treatment standards of the European Union Directive on water quality for human consumption 98/83/EC transposed into Romanian legislation Law 458/2002 on water quality as amended by Law no. 311/2004, Government Ordinance no.11/2010 and Government Ordinance no. 1/2011. The entire quantity of sludge from the treatment process will be treated to a solids content of at least 35%. [18]

### 2.2.1.2. WATER SUPPLY SYSTEM ANINA

The project works investment provided by CS-CL-12 rehabilitation and extension of transmission pipes, distribution networks and sewerage networks in Anina are: new water adduction networks treated a total length of 8,426 km (Table 5).

- new water adduction networks in a total length of 8,426 km.
- new storage tank V = 100 cubic meters located within the existing tank called Oraş Nou V = 2.500 m<sup>3</sup>;
- rehabilitation of five existing storage tanks: Maial I with V = 90 m<sup>3</sup> capacity, Maial II with V = 2x150 m<sup>3</sup> capacity, Dealul Crucii with V = 180 m<sup>3</sup> capacity, Casa Elevului with V = 480 m<sup>3</sup> capacity and Bradet with V = 90 m<sup>3</sup> capacity, including the introduction of SCADA system;
- Creating new water pumping station, buried concrete building with interior dimensions of 4,00 x 4,00 m x 2,50 m;
- Rehabilitation of distribution network with a length of 7,430 km, comprising 18 streets, 50 fire hydrants underground, 441 connections, 53 manholes and 50 water valves buried;
- Expanding distribution network with a length of 4,132 km, includes 10 streets, 31 underground fire hydrants, 201 connections, 22 manholes and 31 buried water valves;

Table 5

New water supply network Anina [18]

No.	Name influent conduit	Tehcnical data		
		Diameter (mm)	Length (m)	Material
1	A1	250	2.362	PEID
2	A2	200	2.610	PEID
3	A3	140	553	PEID
4	A4	200	150	PEID
5	A5	160	2.751	PEID
-	<b>TOTAL:</b>	-	<b>8.426</b>	-

### 2.2.2. WATER SUPPLY SYSTEM ANINA LOCALITY - MASTER PLAN WATER - WASTEWATER PHASE 2 PERIOD 2014-2020

The list of priority investments proposed to be made in water supply for Anina crowding in the Water-Wastewater Master Plan Phase 2 financed by the Cohesion Fund 2014-2020 includes works totaling 5.967.971 Euro.

### 2.2.3. PRIORITY INVESTMENT IN WASTEWATER TREATMENT PLANT ANINA LOCALITY - MASTER PLAN WATER - WASTEWATER PHASE 1

By Water Master Plan - Phase 1 Wastewater ongoing, financed by the Cohesion Fund (CF) for Anina are provided in Annex 4.3 of the documentation works project contracts provided include the following works [18]:

- The works in contract CS-CL-03 construction and rehabilitation of wastewater treatment plants in Resita, Bocşa, Anina and Oraviţa;
- Project CS-CL-12 rehabilitation and extension of transmission pipes, distribution networks and sewerage networks in Anina.

### 2.2.3.1. WASTE WATER TREATMENT PLANT

In the Anina town is a treatment plant that treats wastewater collected from Steierdorf district, other areas/districts do not receive treatment plant, the wastewater collected is discharged into springs that cross the city. Waste water treatment plant in district Steierdorf is a compact station with a capacity of  $Q = 450 \text{ m}^3/\text{day}$ , the main technological objects of waste water treatment plant Steierdorf are mechanical treatment, biotreater, step of mud treatment system with UV disinfection station and measuring the parameters of the purified water.

In order to comply with European legislation and Romanian works required for the construction of a new water treatment plant, on 10.000 sqm newly site, areas which remain uncovered by the existing treatment station.[18] New treatment plant capacity is 2.000 L.E., sewerage system type divider and emissary is Anina stream. The project proposes a treatment plant type compact mechanical treatment, biological treatment, secondary sedimentation and mud processing. As outlined in the strategy of mud management, mud after dehydration (dry matter percentage 22%) will be employed in agriculture. A deposit of mud storage capacity sufficient for a period of 6 months will be done inside the treatment plant. Uploads and wastewater influent concentrations to be treated, are shown in Table 6.

Table 6

Loads and concentrations in wastewater treatment plant [18]

Parameters	Load (kg/day)	Concentration (mg/l)
Solids (MSS):	162,9	314,6
Biochemical oxygen demand (BOD5):	154,4	298,1
Chemical oxygen demand (COD):	254,4	491,1
Total nitrogen (TN):	6,22	12
Total phosphorus (TP):	2,17	4,2

The effluent from the treatment plant will meet EU standards for treated wastewater Directive 91/271/EEC Effluent quality standards for "sensitive waters".

### 2.2.3.2. SEWERAGE NETWORK

The works in investment project provided by CS-CL-12 Rehabilitation and extension of transmission pipes, distribution networks and sewerage networks in Anina are:

- Rehabilitation of sewerage network with a total length 2.011 m, on a total of 3 blocks, comprising 107 homes 315mm, 160mm PVC and 27 manholes 400mm, 200mm PVC;
- Extension of sewer network with a total length 26.657 m, a total of 50 street sections, with 1.117 fireplace connections 315mm, 160mm and 84 PVC fireplace fittings 400mm, 200mm PVC;
- Construction of 8 wastewater pumping stations.[18]
- 

### 2.2.4. WASTEWATER TREATMENT PLANT ANINA LOCALITY - MASTER PLAN WATER - WASTE WATER PHASE 2 PERIOD 2014-2020

The list of priority investments proposed to be made in sanitation and wastewater treatment for the agglomeration Anina in the Master Plan Water-Wastewater Phase 2 for the period 2014-2020 includes works totaling 2.345.551 Euro.

## CONCLUSIONS

In the absence of projects / measures for sustainable development of the locality Anina, the local community is likely to be decoupled from the economic life of the county and the region. Taking into account the tradition and present situation, from analysis of economic and social state of the town in various fields: infrastructure and public utilities,

urban development, economy, agriculture and forestry, tourism, environment, social assistance, education, culture, sustainable development it is possible by exploiting local resources, natural and human potential, human resources, through the establishment and implementation of projects / measures grouped into strategic axes, while identifying appropriate funding programs.

In this context, major investment projects are needed to develop infrastructure and public utilities infrastructure of roads, water supply, sewerage and wastewater treatment, waste management, together with identifying funding sources in perspective of the new operational programs 2015-2020.

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